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EXAMINER

ROANE, AARON F

ART UNIT	PAPER NUMBER
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3739

DATE MAILED: 12/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SP

Office Action Summary

Application No.

09/914,375

Applicant(s)

CRONIN, NIGEL

Examiner

Aaron Roane

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-23 and 25-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,13-20,23,25-35 and 38-45 is/are rejected.
- 7) ☒ Claim(s) 7-12,21,22,36 and 37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 5, 6, 13-20, 23, 25-35, 38-43 and 45 are rejected under 35 U.S.C. 102(e) as being anticipated by Carl et al. (USPN 6,047,216).

Regarding claim 1, 13, 16-18, 23 and 25, Carl et al. disclose an elongate microwave radiator for insertion into a living body to treat biological tissue at a predetermined

operating frequency, the radiator comprising: a monopole antenna (300) at its tip, the monopole antenna comprising: a monopole (distal portion of 314); and dielectric material (316) surrounding the monopole, the dielectric material being configured to act as a resonator at said predetermined operating frequency, and encompassing generally the whole of the near-field radiation emitted by the monopole, see col. 7-10, 14-16, and particularly col. 20, lines 13-32 and figures 2, 3 and 10. Carl et al. further disclose that a rounded, generally hemispherical tip portion which is an extension of the dielectric body extends beyond the end of the antenna, see col. 14-16, and particularly col. 20, lines 13-32 and figures 2, 3 and 10. Additionally, since the operating wavelengths of radiation are in the range such that it is trivial to verify that the rounded, generally hemispherical tip portion has a radius that is generally equal to half the wavelength of the radiation in the dielectric material.

Regarding claims 5, 6 and 26-29, Carl et al. disclose the claimed invention. Carl et al. disclose that the frequency range is 2 GHz to 300 GHz which yields a wavelength range of roughly 1 mm to 150 mm in free space and 0.714mm to 107mm. Here the major dimension of the antenna is the length coinciding with the length of (322), wherein the dielectric material of the monopole antenna comprises a generally cylindrical body with the monopole of the monopole antenna extending axially at its center a distance L (322). Additionally, Carl et al. disclose that the diameter of the catheter or elongate device is 2.76 millimeters, see abstract, col. 20, lines 13-32 and figure 10. Therefore the

wavelength of radiation is less the radius of the dielectric, and therefore inherently the dielectric extends radially more than half a wavelength of radiation in the dielectric.

Regarding claim 14, Carl et al. disclose a pointed tip (distal end adjacent to section 322).

Regarding claim 15, Carl et al. disclose a tip portion comprised of a different material (metal choke 318) from the dielectric body, see col. 15, line 57 through col. 16, line 17 and figure 3.

Regarding claim 19, Carl et al. further disclose that the antenna is the distal extension of an inner conductor (314) of a coaxial conductor (310), wherein the inner conductor (314) extends longitudinally further (i.e., projects beyond the outer screening of the coaxial conductor at the distal end to form the monopole of the monopole antenna.) than the outer conductor (312), see col. 15, line 57 through col. 16, line 17 and figures 2, 3 and 10.

Regarding claim 20, Carl et al. disclose the claimed invention. Carl et al. disclose that the frequency range is 2 GHz to 300 GHz which yields a wavelength range of roughly 1 mm to 100 mm. Therefore, within the dielectric material the wavelength range is roughly 0.714mm to 107mm. Additionally, the examiner interprets the use of the term “generally” as within a factor of 10. This means that as long as the length of the antenna falls within a range of 0.0714mm to 107cm the disclosure by Carl et al. meets the claim, which it inherently does.

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Regarding claims 30-35, Carl et al. disclose the claimed invention including the monopole antenna. Carl et al. disclose that the frequency range is 2 GHz to 300 GHz which yields a wavelength range of roughly 1 mm to 150 mm. Therefore, within the dielectric material the wavelength range is roughly 0.714mm to 107mm. The examiner interprets the use of the term “generally” as within a factor of 10. This means that as long as the length of the antenna falls within a range of 0.0714mm to 107cm the disclosure by Carl et al. meets the claim, which it inherently does. Carl et al. disclose the hemispherical tip, see figure 3. The device disclosed by Carl et al. inherently involves all of steps of the claimed method since it discloses all of the claimed structural features. As far as claim 33 is concerned, the length of the antenna certainly falls within the wide range of wavelengths of radiation within the dielectric which is 0.0714 mm to 107cm, which again meets the claimed invention.

Regarding claims 38-43, Carl et al. disclose the claimed invention including the monopole antenna. Carl et al. disclose that the frequency range is 2 GHz to 300 GHz which yields a wavelength range of roughly 1 mm to 150 mm. Therefore, within the dielectric material the wavelength range is roughly 0.714mm to 107mm. The examiner interprets the use of the term “generally” as within a factor of 10. This means that as long as the length of the antenna falls within a range of 0.0476 mm to 714 mm the disclosure by Carl et al. meets the claim, which it inherently does. Carl et al. disclose the hemispherical tip, see figure 3. The device disclosed by Carl et al. inherently involves all of steps of the claimed method since it discloses all of the claimed structural features.

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The partial reflection of electromagnetic waves is an inherent part of traveling waves that are incident on boundary interface of two differing indices of refraction (which are the dielectric and the biological medium). As far as claim 42 is concerned, the length of the antenna certainly falls within the wide range of wavelengths of radiation within the dielectric which is 0476 mm to 71.4 mm, which again meets the claimed invention.

Regarding claim 45, Carl et al. disclose an elongate radiation applicator for insertion into a living body to couple radiation into biological material, the applicator comprising a monopole antenna (322, specifically the length between 324 and 326) and a dielectric body (316) surrounding the monopole the length of the monopole and the dielectric constant and dimensions of the dielectric body relative to the antenna being selected in relation to an intended operating frequency of the applicator so that the dielectric body encompasses generally the whole of the near-field of radiation emitted by the antenna, see col. 14-16, and particularly col. 20, lines 13-32 and figures 2, 3 and 10.

Claim 44 is rejected under 35 U.S.C. 102(e) as being anticipated by Berube et al. (USPN 6,306,132 B1).

Regarding claim 44, Berube et al. disclose a method of treating a tumor in a liver using a radiation applicator (21) comprising an elongate radiator body (35) with a pointed tip (23) for insertion into the liver and a power input (not shown but connected to the proximal end of 28, see col. 3, lines 32-35) to generate microwaves within the body and

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to transmit microwave radiation into the liver, the method comprising the steps of:
penetrating the liver with the pointed tip (see abstract, col. 5, lines 5-48); inserting the
body into the liver to the region of the tumor (see col. 5, line 5 through col. 6, line 10 and
col. 6, lines 48-62); and powering the applicator via the power input to transmit
microwaves and heat said region of the tumor (see abstract, col. 2, lines 16-36, col. 3,
lines 12-38,), also in general see col. 1-5 and figures 1-6.

Response to Arguments

Applicant's arguments filed 10/04/2005 and 8/24/2005 have been fully considered but they are not persuasive. The examiner will first address the remarks from the supplemental response filed 8/24/2005.

Regarding the remarks of the supplemental amendment/response filed on 10/04/2005, the examiner does not object to and is satisfied the terms "monopole" and "monopole antenna" are supported via the generally accepted meaning of the two terms above and the drawings of the present application. Additionally, the examiner would like to point out that Carl et al. specifically discloses a monopole antenna (see col. 9, lines 62-64) and therefore meets the claimed subject of a "monopole" and "monopole antenna."

Next, the remarks filed 8/24/2005 will be addressed. Beginning on page 17 and continuing onto page 21 Applicant outlines the amendments to the claims and discusses in detail the 1) dielectric acting as a resonator and 2) the "dielectric material encompasses generally the

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whole of the near-field radiation at the predetermined operating frequency.” The examiner wishes to again point out that the disclosure by Carl et al. presents a monopole antenna device that has a surrounding dielectric material that radially extends from the monopole a of about 1.5 mm and a range operating wavelengths such that 1.5 mm is about half the operating wavelength in the dielectric material and therefore as noted by Applicant on page 18, 2nd paragraph, the dielectric acts as a resonator. Additionally this radial extension of the dielectric meets the recited property that the “dielectric material encompasses generally the whole of the near-field radiation at the predetermined operating frequency.”

On page 21, 3rd to the last line of paragraph 2, Applicant asserts that the minimum operating wavelength in the dielectric is 69mm. However the examiner disagrees and cites col. 20, lines 14-32 wherein Carl et al. discuss an oscillating chip embodiment that may use either a “waveguide antenna, disk-loaded monopole antenna, or other antenna,” and use operating frequencies from 2 GHz to 300 GHz. Therefore the minimum wavelength in the dielectric material is given by $c/n_{\text{die}}/(\text{max freq.}) \approx 3 \times 10^{11} \text{ mm/s} / 1.5 / 3 \times 10^{11} \text{ 1/s} \approx 0.66 \text{ mm}$, where c is the speed of light, n_{die} is the index of refraction of the dielectric which is about 1.5 and **max freq.** is the maximum operating frequency of the antenna, 300 GHz. Since the radial extension of the dielectric material away from the monopole is 1.38 mm the dielectric material may easily accommodate from 0.5 wavelengths to 2 wavelengths (within the dielectric material)!! This meets the claimed invention (at least as disclosed by the above rejected claims).

The arguments/comments/remarks beginning on page 21, last paragraph up to and including the first paragraph on page 25 are all addressed by the above rebuttal.

Lastly, Applicant refutes the use of Kasevich et al. in rejecting (currently amended) claim 44. Applicant's arguments with respect to claim 44 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claims 7-12, 21, 22, 36 and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Roane whose telephone number is (571) 272-4771. The examiner can normally be reached on Monday-Thursday 7AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda Dvorak can be reached on (571) 272-4764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A.R. *A.R.*
December 15, 2005

Michael Peffley
MICHAEL PEFFLEY
PRIMARY EXAMINER